**Career Academy Integrated Unit Plan**

**Academy Name: HEMS**  **School: Atlantic High School**

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| Integrated Unit Plan Title: Energy Flow within Ecosystems |
| Courses to integrate: Biology & Agriscience Foundations |
| Grade Level: 9th |
| Timeline & Duration: 1 week |

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| Unit Summary: All organisms need energy to carry out essential functions, such as growth, movement, maintenance and repair, and reproduction. In an ecosystem, energy flows from the sun to autotrophs, then to organisms that eat the autotrophs, and then to organisms that feed on other organisms. The amount of energy an ecosystem receives and the amount that is transferred from organism to organism affects the ecosystem’s structure. (Adopted from Holt, Rinehart, and Winston, *Modern Biology*, pg. 366) |

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| **Overview of Activities/Lessons per Course** | | | | |
| Course | Biology | Agriscience |  |  |
| Activity/Lesson | Reading/Writing to Learn: Intro to energy flow within ecosystems | KWL: Energy transfer within food webs.  Lab/Demo: Flow of Energy thru a Food Web (Yarn Web). |  |  |
| Activity/Lesson | Lab: Predator and Prey Relationships | Storybook: Energy Flow continued. |  |  |

**Lesson Instructions for BIOLOGY:**

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| **Standards (Performance Tasks or Course Frameworks or Sunshine State Standards):**  SC.B.(1.4.1, 1.4.2, 1.4.7); SC.F.1.4.4; SC.G.1.4.2; SC.H.(1.4.4, 1.4.7).  **Rigor & Relevance (quadrant):**  B |
| **Instructions to Teacher:**   1. Give each student a copy of the Reading/Writing to learn template, the poem (The Lion and the Gazelle), Newspaper article (To be decided), and their textbook. Prepare a transparency and/or digital copy (something for you to fill in as a model) of the Reading/Writing to learn template. Guide the class through the template and read the poem first. Continue template. Then read news article. Continue Template. Finally, have the students read the passage on pages 368 and 369 from their textbooks. Complete template. While working through the template encourage classroom discussion to help students gain/access prior knowledge. After a wrap-up review, assign students to answer questions 1 – 6 from page 369 of their textbook. |
| **Instructions to Students:**   1. Read poem. Complete the far left column of the Reading/Writing to learn template. Await teacher initiation of group discussion. Read newspaper article. Complete the middle column of the Reading/Writing to learn template. Again, wait for teacher initiation of group discussion. Read pages 368 and 369 in your textbook. Complete the remaining column on the Reading/Writing to learn template. Upon completion, the teacher will begin a wrap-up discussion for today’s activity. Finally, by using complete sentences, answer questions 1 – 6 from page 369 into your notebook. |
| **Instructions for Student Accommodations:**   1. In addition to using the Reading/Writing to learn template, the materials could be read aloud and/or extended permitted as necessary. Teacher modeling during template completion. |
| **Assessment for Activity:**   1. Formative assessment of class participation while reading. Questions being answered into the notebook. |
| **Approximate Length of Time for Activity:**  90 minutes |
| **Materials Needed:** Template, poem, news article, textbook, pencil, and paper. |
| **Resources Needed:**   1. Internet access for news article and poem, and the textbook. |
| Attachments: Poem, News Article, and Reading/Writing to learn template |

**Lesson Instructions for Agriscience Foundations 1:**

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| **Standards (Performance Tasks or Course Frameworks or Sunshine State Standards ):**  1. and 2. Agriscience Foundations I – 04.02  **Rigor & Relevance (quadrant):**   1. B 2. D |
| **Instructions to Teacher:**   1. Give each student a copy of the Knowledge chart and explain that students will write what they already know about how energy flows through an ecosystem, and then what they would like to know in the second column. As the unit progresses, we will fill in the last column together. After KWL discussion, proceed to food web activity. 2. Prior to today, prepare manila envelopes [1 for each group (use same groups as KWL activity)] that will contain at least 6 index cards. On each index card write one of the following: GRASS, RABBIT, CRICKET, SNAKE, HAWK, and MUSHROOM. Each manila envelope needs to be accompanied by a ball of yarn and some tape. Guide students thru the activity. After students have their initial web complete, have students answer the following questions from an overhead projector or the front board (their answers should be in a written format as a lab write up to turn in before leaving that day):    * 1. Describe your food web interactions in detail. For example, list who is connected to whom via the yarn. Then explain how energy flows throughout this web your group has created.      2. How much energy transfers from one organism to another?      3. What would happen to your food web if one of the organisms is removed?      4. What if two are removed?      5. What are some factors that my cause such an event to occur?      6. What things do humans do that may increase or decrease this type of relationship? |
| **Instructions to Students:**   1. You will have a copy of the KWL chart. This chart is divided into three columns. In the first column, the K column, you will write things you already know about energy flow thru an ecosystem. The second column is the W column and you will write things you would like to learn about energy flow thru an ecosystem. The last column is the L column and as we progress through the unit we will fill in this column together with things we have learned about energy flow thru an ecosystem. 2. While in groups, you will receive a manila envelope (each containing 6 index cards with different organisms written on them), tape, and a ball of yarn. Remove the index cards and have each student randomly choose one index card. Tape the index card to your chest so that others may read the organism you represent. Once all students have their organism index card taped, the student labeled “GRASS” holds the very end of the ball of yarn. While holding the end, this person now passes the ball of yarn to another organism that would consume the GRASS. Continue this process of passing the yarn while holding on to your previous connecting organism until ALL possible relationships are identified. While holding your WEB, await teacher initiated discussion. After discussion, complete the questions assigned by the teacher on one sheet of paper for the entire group to hand in before leaving today. |
| **Instructions for Student Accommodations:**   1. Divide the students randomly into small groups (3 – 5 students depending on class size). Allow the students three minutes to discuss and record the required information for the first column. Use a clock with an alarm so that students know when they must stop. Have each group share and create a master list to be displayed in the classroom for the duration of the unit. Repeat the process for the second column. 2. Continue using group for “food web” activity. |
| **Assessment for Activity:**   1. This activity will be included as part of their notebook grade. 2. Food Web questions as identified above in the teacher instructions. |
| **Approximate Length of Time for Activity:** 90 minutes |
| **Materials Needed:**   1. Knowledge chart for each student, one large (poster size) classroom Knowledge chart, clock with alarm, and markers. 2. 6 Manila envelopes, 36 index cards, 6 balls of yarn, 6 rolls of tape, one marker, over head transparency or chalkboard or whiteboard, and paper. |
| **Resources Needed:**   1. Textbook |
| Attachments:Knowledge chart (see below)  1. Questions for assessment (see below) |

**Lesson Instructions for Agriscience Foundations 1:**

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| **Standards (Performance Tasks or Course Frameworks or Sunshine State Standards ):**  LA.A 2.4.1; LA.A 2.4.4; LA.A 2.4.6; LA.C 1.4.1; LA.C 1.4.3  **Rigor & Relevance (quadrant):**  D – Adaptation  **Essential Skills** (e and m):  e03; e24; e32, e46; e59 |
| **Instructions to Teacher:**   1. Students will be assigned to produce an illustrated storybook depicting energy flow through an ecosystem. Students will work in pairs, and may choose from a variety of environments, including wetlands, ocean, forest, desert, prairie, farmland, etc. The storybook should have an appropriately illustrated cover, four panels of story line, and a back cover which includes a written summary describing the energy flow chosen by the team. |
| **Instructions to Students:**   1. Your goal is to research the energy flow through a specific ecosystem and design and illustrate a storybook depicting your choice. Consider the different ecosystems found in the state of Florida. (Wetlands, ocean, forest, prairie, farmland, etc.) and choose one. Your storybook should illustrate a food web and landscape found in the selected ecosystem. Your storybook will include an illustrated, titled cover, four panels of story line, and a written descriptive summary on the back cover. |
| **Instructions for Student Accommodations:**  Students will be working collaboratively to utilize each student’s skills. |
| **Assessment for Activity:**  The storybooks will be graded using a rubric. |
| **Approximate Length of Time for Activity:** 90 minute class period. |
| **Materials Needed:** Colored pencils, markers, art paper. |
| **Resources Needed:** textbooks, internet for research |
| Attachments: storybook rubric |

**Writing to Learn**

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| **Source:**  **Facts:**  **Response:** | **Source:**  **Facts:**  **Response:**  **Connection:**  **I wonder:**  **I want to know:** | **Source:**  **Facts:**  **Response:**  **Connection:**  **Now that I know:**  **I’m interested in knowing:** |

From *Yellow Brick Roads: Shared and Guided Paths to Independent Reading 4-12* by Janet Allen.



The Lion and the Gazelle

Every morning in Africa, a gazelle wakes up. It knows it must run faster than the fastest lion or it will be killed.

Every morning a lion wakes up. It knows it must outrun the slowest gazelle or it will starve to death.

The moral:  
It doesn’t matter if you are a lion or a gazelle. When the sun comes up, you better be running.



Food Web Activity Assessment Questions

Agriscience Foundations 1

HEMS Academy

1. Describe your food web interactions in detail. For example, list who is connected to whom via the yarn. Then explain how energy flows throughout this web your group has created.
2. How much energy transfers from one organism to another?
3. What would happen to your food web if one of the organisms is removed?

1. What if two are removed?
2. What are some factors that my cause such an event to occur?
3. What things do humans do that may increase or decrease this type of relationship?

Storybook Rubric

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Block\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- | --- | --- |
| Category | 5  Strong | 4  Moderately Strong | 3  Average | 2  Moderately Weak | 1  Weak |
| **1. The storybook contains**  **appropriate items and**  **information.** |  |  |  |  |  |
| **2The storybook is clean**  **and neat, and the**  **information on it is well**  **organized.** |  |  |  |  |  |
| **3. The storybook is colorful**  **and creative.** |  |  |  |  |  |
| **4 The spelling,**  **punctuation, and**  **grammar of any text in**  **the storybookr are accurate.** |  |  |  |  |  |
| **5. Any artwork in the**  **storybook is appropriate**  **and carefully executed.** |  |  |  |  |  |
| **6. The information in**  **the storybook is**  **appropriate to the topic.**  **7. The storybook shows an**  **understanding of the**  **topic and related**  **concepts.** |  |  |  |  |  |
| **8. The storybook fulfills the**  **requirements of the**  **assignment** |  |  |  |  |  |
| Totals |  |  |  |  |  |

Score:\_\_\_\_\_\_\_\_\_\_\_\_\_